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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/525,707	03/14/2000	Monty M. Denneau	Y0999-493-(8728-334)	9035

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EXAMINER

ENGLAND, DAVID E

ART UNIT	PAPER NUMBER
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2143

DATE MAILED: 11/07/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/525,707

Applicant(s)

DENNEAU ET AL.

Examiner

David E. England

Art Unit

2143

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 August 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 August 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☒ The proposed drawing correction filed on 15 August 2003 is: a) ☐ approved b) ☒ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

DETAILED ACTION

1. Claims 1 – 9 are presented for examination.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the wrap around each end processor must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the x-axis, y-axis, and finally z-axis must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

3. The drawing teaches a two dimensional figure instead of a three dimensional figure, (i.e. there are no Z nodes in the figure to disclose three dimensions).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Art Unit: 2143

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation of, "wrapping around a first end processor, proceeding to and wrapping around a second end processor," must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. This limitation would make one interpret that an end processor on the far right is connected to an end processor to the far left.

Specification

6. The substitute specification filed 08/15/2003 has not been entered because it does not conform to 37 CFR 1.125(b) and (c) because: a marked-up copy of the substitute specification has not been supplied (in addition to the clean copy).

Claim Rejections - 35 USC § 103

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Art Unit: 2143

8. Claims 1 – 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi et al. (5826033) (hereinafter Hayashi) in further view of Thorson (6055618).

9. Referencing claim 1, as interpreted by the Examiner, Nugent teaches a method for routing packets on a linear array of N processors connected in a nearest neighbor configuration, comprising the steps of:

10. for each axis required to directly route a packet from a source to a destination processor, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18),

11. determining whether a result of directly sending a packet from an initial processor to a target processor is less than or greater than a number of moves, respectively, the initial processor being the source processor in a first axis, the target processor being the destination processor in a last axis, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18);

12. directly sending the packet, when the result is less than a number of moves, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18); and

13. indirectly sending the packet so as to follow at least one of the wrapped paths, when the result is greater than a number of moves, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18). Nugent does not specifically teach a number of moves equaling $N/2$, and

14. for each end processor of the array, connecting unused outputs to corresponding unused inputs so as to create a plurality of wrapped paths. Hayashi teaches a number of moves equaling $N/2$, (e.g. col. 9, lines 27 – 38 & col. 16, lines 29 – 56). It would have been obvious to one skilled in the art at the time the invention was made to combine Hayashi with Nugent because

using algorithms to modify data transmission is a common practice among network devices to make a system more efficient in the manner it transmits data. Therefore, utilizing an algorithm would make a system more efficient in finding that fastest path for data transmission. Hayashi does not specifically teach for each end processor of the array, connecting unused outputs to corresponding unused inputs. Thorson teaches for each end processor of the array, connecting unused outputs to corresponding unused inputs so as to create a plurality of wrapped paths, (e.g. col. 5, line 38 – col. 6, line 25, “*negative directions*”, & col. 6, lines 40 – 58, “*bi-directional*”, & col. 7, line 36 – col. 8, line 12 & Fig. 4). It would have been obvious to one skilled in the art at the time the invention was made to combine Thorson with the combine system of Nugent and Hayashi because it would be more efficient for a system to utilize unused ports that could be connected to other ends of the system changing the linear or cube shaped network to a torus, “doughnut” shape that could result in faster transmission of data that is located on the on the further end of the system.

15. Referencing claim 2, Nugent teaches packets are routed along the x-axis, then the y-axis, and finally the z-axis, (e.g. col. 8, lines 40 – 45 & col. 13, line 61 – col. 14, line 18).

16. Referencing claim 3, as interpreted by the Examiner, Nugent does not specifically teach the step of randomly sending the packet using either of said sending steps, when the result is equal to $N/2$ moves and N is an even number. Hayashi teaches the step of randomly sending the packet using either of said sending steps, when the result is equal to $N/2$ moves and N is an even number, (e.g. col. 9, lines 27 – 38 & col. 16, lines 29 – 56). It would have been obvious to one

Art Unit: 2143

skilled in the art at the time the invention was made to combine Hayashi with Nugent because it would be more convenient for the system when the algorithm is equal, it would not make a difference in which direction the data was sent because it is equal distance and no matter which way the data is transmitted the data will arrive at the same time.

17. Referencing claim 4, as interpreted by the Examiner, Nugent and Hayashi do not specifically teach said indirectly sending step comprises the step of initially sending the packet in an opposing direction with respect to the target processor, wrapping around a first end processor, proceeding to and wrapping around a second end processor, and proceeding to the target processor. Thorson teach said indirectly sending step comprises the step of initially sending the packet in an opposing direction with respect to the target processor, wrapping around a first end processor, proceeding to and wrapping around a second end processor, and proceeding to the target processor, (e.g. col. 5, line 23 – col. 6, line 17 & Fig. 4). It would have been obvious to one skilled in the art at the time the invention was made to combine Thorson with the combine system of Nugent and Hayashi because it would be more efficient and faster for a system to indirectly send the data and have it “wrap around” a processor if the distance of the data traversing an indirect route is shorter then traveling a longer route taking a direct route.

18. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Thorson (6055618) in further view of Ganmukhi et al. (6449667) (hereinafter Ganmukhi).

Art Unit: 2143

19. Referencing claim 5, as interpreted by the Examiner, Nugent, Hayashi and Thorson do not specifically teach the step of the target processor receiving the packet upon a second pass thereby, when the packet is sent indirectly. Gunmukhi teaches the step of the target processor receiving the packet upon a second pass thereby, when the packet is sent indirectly, (e.g. col. 7, line 11 – col. 8, line 64). It would have been obvious to one skilled in the art at the time the invention was made to combine Gunmukhi with the combine system of Nugent, Hayashi and Thorson because it is common for a network in a tree architecture to pass through a parent node more than once in the transfer of data to and from another network device.

20. Claims 6 – 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Thorson (6055618) in further view of Ritter et al. (5570084) (hereinafter Ritter).

21. Referencing claim 6, as interpreted by the Examiner, Nugent, Hayashi and Thorson do not specifically teach the step of adding a 0-bit or a 1-bit to the packet, depending on whether the packet is to be injected into a corresponding axis in the positive or the negative direction, respectively. Ritter teaches the step of adding a 0-bit or a 1-bit to the packet, depending on whether the packet is to be injected into a corresponding axis in the positive or the negative direction, respectively, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Thorson because it would be more efficient for a system to utilize the functionality of a network protocol and place in a header a direction field/bit

Art Unit: 2143

and attach the header to the packet so other network devices can read the packet header and know which direction to send it to get to it's destination.

22. Referencing claim 7, as interpreted by the Examiner, Nugent, Hayashi and Thorson do not specifically teach the packet can only be removed when traveling in the positive direction, if the 0-bit is added thereto. Ritter teaches the packet can only be removed when traveling in the positive direction, if the 0-bit is added thereto, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Thorson because it would be more efficient when a packet reaches a node that ends its travel on an axis and has to travel on another axis to get to its destination node, to have to change the field that determines the direction for the packet to travel. Therefore, removing the packet from the header, changing the header information and reattaching the header to the packet so it can be transmitted to the destination node.

23. Referencing claim 8, as interpreted by the Examiner, Nugent, Hayashi and Thorson do not specifically teach the packet can only be removed when traveling in the negative direction, if the 1-bit is added thereto. Ritter teaches the packet can only be removed when traveling in the negative direction, if the 1-bit is added thereto, (e.g. col. 3, lines 22 – 64 & col. 6, line 47 – col. 7, line 14). It would have been obvious to one skilled in the art at the time the invention was made to combine Ritter with the combine system of Nugent, Hayashi and Thorson because of similar reasons stated above.

24. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nugent (5175733) in view of Hayashi (5826033) in further view of Thorson (6055618) in further view of Ritter et al. (5570084) (hereinafter Ritter) in further view of Ganmukhi (6449667).

25. Referencing claim 9, as interpreted by the Examiner, Nugent, Hayashi, Thorson and Ritter do not specifically teach the step of placing the packet in a first queue or a second queue, depending on whether the 0-bit or the 1-bit is added to the packet, respectively. Ganmukhi teaches the step of placing the packet in a first queue or a second queue, depending on whether the 0-bit or the 1-bit is added to the packet, respectively, (e.g. cols. 35 – 38). It would have been obvious to one skilled in the art at the time the invention was made to combine Ganmukhi with the combine system of Nugent, Hayashi, Thorson and Ritter because it would be more efficient to have separate transmission queue that have a specific function as apposed to having one queue and switching modes every time a different packet enters the queue. Therefore, creating a faster system to transmit data across the network.

Response to Arguments

26. Applicant's arguments with respect to claims 1 – 9 have been considered but are moot in view of the new ground(s) of rejection.

Art Unit: 2143

27. In the remarks, Applicant argues in substance that Nugent, alone or in combination with the other applied references, does not disclose or even suggest a method for routing packets on a linear array of N processors connected in a nearest neighbor configuration, including, inter alia, determining whether a result of directly sending a packet from an initial processor to a target processor is less than or greater than $N/2$, and indirectly sending the packet so as to follow at least one of the wrapped paths, when the result is greater than $N/2$ moves, as recited in claim 1.

28. As to part 1, Examiner would like to draw the Applicant's attention to the rejected claims that have been modified to accommodate the claims that were amended. Furthermore, Examiner would like to draw the Applicant's attention to the objection to the drawing that was mailed with the first Office Action on 05/11/2003 that states,

29. "The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the direct and indirect paths must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.", the Applicants supposed amendment to this lacking is the insertion of a negative X direction ($-X$) and a positive X direction ($+X$). This type of amendment would lead one of ordinary skill in the art to interpret the claim language as a direct transmission is $+X$ and indirect transmission is $-X$.

30. Therefore, as interpreted by the Examiner, as described Thorson discloses connecting unused inputs and outputs by utilizing wrapping around connections, (e.g. col. 2, lines 20 – 60). Also, Thorson discloses sending information indirectly in a bi-directional network, similar to Nugent's teachings, (e.g. Thorson, col. 5, line 38 – col. 6, line 25, "*negative directions*", & col.

Art Unit: 2143

6, lines 40 – 58, “*bi-directional*”, & col. 7, line 36 – col. 8, line 12). With the combination of Nugent’s and Thorson’s sending of information in opposite direction and Thorson’s topology of wrapping around the connections of unused input and output ports, and the reference of Hayashi teaching all the deficiencies of Nugent and Thorson, discloses what is claimed in the application. Example, if there are three nodes on an X plane, A, B, C, and A is connected to B, B is connected to C, C is connected to A, in a bi-directional network. A wants to send something to C. After the algorithms disclosed in the references above are finished processing, node A concludes that sending a packet to node C through B would have more hops as opposed to indirectly sending the packet, in a negative direction, to node C. Doing so provides a faster, more efficient transmission of information.

31. If Applicant were to amend the claims to more specifically point out the true nature of the invention, i.e. specifically stating that the end nodes wrap onto themselves, with the direction the packet with traverse, as stated in the specification, could get around the references **but would require further search and consideration.** The Applicant is advised to contact the Examiner if there are any questions as to what could be utilized in the amendment to possibly necessitate allowable information.

Conclusion

32. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2143

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

33. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

34. a. Carvey et al. U.S. Patent No. 6606656 discloses Apparatus and methods for connecting modules using remote switching.

35. b. Cotter et al. U.S. Patent No. 6069720 discloses Optical telecommunications network.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David E. England whose telephone number is 703-305-5333. The examiner can normally be reached on Mon-Thur, 7:00-5:00.

Art Unit: 2143


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David A. Wiley can be reached on 703-308-5221. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is none.

David E. England
Examiner
Art Unit 2143

De

DL


DAVID WILEY
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